

REMARKS

This amendment is in response to a final Office action (Paper No. 14) mailed 26 June 2003. Upon entry of this amendment, claims 3, 6, 27, 36 and 37 will be pending in this application. Applicant has amended claims 3, 6, 27 and 36 by this amendment and has canceled claims 2, 9 and 23-25 without prejudice or disclaimer as to their subject matter by this amendment.

In Paper No. 14, the Examiner objected to claims 2, 3, 6 and 9 because claim 2 claimed that the nozzle plate was *directly* connected to the substrate. Applicant has removed the word *directly* from the claims making this objection moot.

In Paper No. 14, the Examiner deemed claims 36 and 37 as allowable. Therefore, Applicant has amended claim 36 by this amendment to place the subject matter of former claim 2 without the controversial word “directly” into claim 36 to make claim 36 an independent claim and to place claims 36 and 37 in condition for allowance.

In Paper No. 14, the Examiner has rejected claims 2, 6 and 9 under 35 U.S.C. 103 (a) as being unpatentable over Sato, JP 404161340A in view of Bassous *et al.*, U.S. Patent No. 3,949,410.

It is noted in Paper No. 14, that the Examiner refers to JP 404161340A as “Tsutomu”. It

is kindly pointed out to the Examiner that this is an error on the part of the Examiner as “Tsutomu” is the Inventor’s first name. The Inventor’s last name is “Sato”. Since patents and printed publications are identified by the Inventor’s Last Name and not their first name, JP 404161340A, in this amendment, will be referred to as “Sato ‘340”.

Regarding claims 2 and 9, Applicant has canceled these claims by this amendment making this rejection moot.

Regarding claim 6, Applicant claims, “wherein each chamber-orifice has a truncated **conical** shape, wherein a lower end of said chamber orifice facing said substrate faces the corresponding ink feed hole and heater formed on the substrate and the other end having a smaller diameter faces toward an outside of said ink-jet printhead”. In Paper No. 14, the Examiner submits that this limitation is taught by FIG. 1 of Sato ‘340. Applicant disagrees.

Applicants note that Webster’s New World Dictionary, Third College Edition defines a **cone** as “a flat-based, single-pointed solid formed by a rotating a straight line that traces out a closed-curve base from a fixed vertex point that is not in the same plane as the base”. The nozzle hole 8 in Sato ‘340 is clearly not a cone as a curved line is rotated, not a straight line. Because FIG. 1 fails to teach or suggest that the nozzle hole 8 of Sato ‘340 is conic, the rejection must be withdrawn.

Applicant further notes that Applicant has previously presented the above argument in the amendment filed on April 10, 2003. In Paper No. 14, the Examiner never acknowledged this argument. Because the Examiner never acknowledged this previously presented argument in Paper No. 14, Applicant submits that Paper No. 14 is a premature final Office action.

Furthermore, Applicant notes that the previously supplied English translation of Sato '340 is absent of any language that suggests that nozzle hole 8 of FIG. 1 of Sato '340 is "conic".

In this instant amendment, Applicant has amended claim 6 by incorporating the subject matter of former claim 2, without the word "directly" into claim 6 to place claim 6 in independent form to place claim 6 in condition for allowance.

In Paper No. 14, the Examiner rejected claim 3 under 35 U.S.C. 103 (a) as being unpatentable over Sato '340 and Bassous '410 in view of Abe *et al.*, U.S. Patent No. 4,914,562.

Regarding claim 3, Applicant claims, "wherein each one of said plurality of heaters is of an omega shape that surrounds said corresponding ink feed hole". In Paper No. 14, the Examiner relies on FIG. 17c of Abe '562 for a teaching of an omega-shaped heater. Then, in Paper No. 14, the Examiner justifies using Abe '562 to fill in for the deficiencies of Sato '340 and Bassous '410 for the purpose of preventing cavitation damage to the heater. Applicant disagrees.

Applicant submits that Sato '340, like Applicant's invention, has an ink feed hole at the geometric center of the heater and the ink chamber. Therefore, if a bubble were to collapse in Sato '340, there is no possibility that a heater could be subject to cavitation damage as a collapsing bubble in Sato '340 would collapse on the ink feed hole where it is impossible to have resistive heater material present. Because cavitation damage cannot be an issue in Sato '340, Applicant submits that one having ordinary skill in the art would not be motivated to turn to Abe '562, and in particular, FIG. 17c of Abe '562 to fill in for the deficiencies of Sato '340. Because there is no motivation to combine Abe '562 with Sato '340, the rejection to claim 3 cannot be valid.

Applicant also submits that one having ordinary skill in the art would not be motivated to use Sato '340 to fill in for the deficiencies of Bassous '410. This is because Bassous '410 does not generate a bubble to eject ink. Instead, Bassous '410 ejects ink electrohydrodynamically. Since Bassous '410 does not produce a bubble, there is no collapsing bubble in Bassous '410 after ejection of an ink droplet. Because there is no collapsing bubble in Bassous '410, there is no cavitation issues in Bassous '410. Because there is no cavitation issues in Bassous '410, there is no motivation to turn to Abe '562 to employ a heater design that prevents cavitation damage to the heater and use it in the designs of Bassous '410. Therefore, one having ordinary skill in the art would not turn to Abe '562 to fill in for the deficiencies of Bassous '410. Therefore, the rejection to claim 3 is invalid.

Applicant has amended claim 3 to incorporate the subject matter of former claim 2 without the word “directly” to make claim 3 an independent claim and to place claim 3 in condition for allowance.

In Paper No. 14, the Examiner rejected claim 27 under 35 U.S.C. 103 (a) as being unpatentable over newly cited Murthy *et al.*, U.S. Patent No. 6,045,214 in view of Bassous ‘410.

Regarding claim 27, Applicant claims, “wherein each chamber-orifice complex hole corresponds to at least one of said plurality of ink feed holes”. In Paper No. 14, the Examiner indicates that FIG. 1 of Murthy ‘214 teaches this feature without any more guidance as to exactly what reference numerals or line or column numbers in Murthy ‘214 teach this feature.

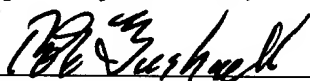
It is kindly noted that FIG. 1 of Murthy ‘214 is a cross section of FIG. 2 which shows seven nozzle holes 18 that correspond to one ink supply 24. Because there are fewer ink supply holes 24 than nozzle holes 18 in Murthy ‘214, Applicant submits that Murthy ‘214 fails to teach or suggest the limitation that each chamber-orifice hole corresponds to at least one ink feed hole. Because neither Murthy ‘214 nor Bassous ‘410 teach this feature of claim 27, the rejection of claim 27 in Paper No. 14 cannot stand.

In this amendment, Applicant has amended apparatus claim 27 to remove the functional limitations to put claim 27 in better condition for allowance.

A fee of \$84.00 is incurred by the addition of one (1) independent claims in excess of 3. Applicant's check drawn to the order of Commissioner accompanies this Response. Should the check become lost, be deficient in payment, or should other fees be incurred, the Commissioner is authorized to charge Deposit Account No. 02-4943 of Applicant's undersigned attorney in the amount of such fees.

In view of the above, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicants' attorney.

Respectfully submitted,


Robert E. Bushnell,
Attorney for the Applicant
Registration No.: 27,774

1522 "K" Street N.W., Suite 300
Washington, D.C. 20005
(202) 408-9040

Folio: P56310
Date: 9/23/2003
I.D.: REB/ML